

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	]	
DIETER GRAFL et al.	]	Group Art Unit: 1726
	]	
Application No. 10/590,681	]	Examiner: Siddiquee, M
Filed: August 25, 2006	]	
	]	
For: CONTACT PLATE FOR FUEL CELLS	]	Attorney Docket 1-17860

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Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.131

We, Dieter Grafl, Raimund Stroebel, Lothar Quick, Joachim Scherer, Bernd Gaugler and Christian Schleier, declare as follows:

1. We are co-inventors of all of the subject matter described and claimed in the above-captioned application.
2. At the time of our invention, we were all employed by Reinz-Dichtungs-GmbH, the assignee of the application.
3. This declaration is to establish completion of the invention prior to January 9, 2004 in Germany, a WTO member country.
4. Prior to January 9, 2004, we conceived of the idea of a contact plate for fuel cells comprising a coherent active area on at least one side of the contact plate, where the side is for contacting at least one of a diffusion layer, a fuel cell electrode and an electrolyte membrane. The contact plate is constructed from passivating, corrosion-resistant metal. The active area includes a contact surface

and recesses, such that the recesses form a channel structure. We also conceived of the idea for a coating of an electrically conductive, corrosion resistant material. The coating includes carbon for depositing in liquid form. The coating is disposed only on the contact surface of the active area.

5. Prior to January 9, 2004, we conceived of the contact plate for fuel cells comprising a coherent active area on at least one side of the contact plate as evidenced from the enclosed partial copy of a German language draft patent application. A true copy of this portion of the application, and with an accompanying dated transmittal letter, dated before January 9, 2004 and with information not relevant to this limitation redacted, is attached as Exhibit A. An English language translation of the relevant section of the draft patent application is attached as Exhibit B. A first Translator's Declaration is also provided. The translation clearly shows we conceived of the contact plate for fuel cells comprising a coherent active area on at least one side of the contact plate.
6. Additionally, attached as Exhibit C is a dated figure that also supports this claim limitation. The figure is accompanied by a dated transmittal letter. The dates in the figure and the letter have been redacted, but they are prior to January 9, 2004. The first Translator's Declaration in Exhibit C provides a translation of the German language title of the figure.
7. Prior to January 9, 2004, we conceived the idea that the side is for contacting at least one of a diffusion layer, a fuel cell electrode and an electrolyte membrane. This is supported by the German language draft patent application in Exhibit A. An English language translation of the relevant section of the draft patent

application is attached in Exhibit B. The translation clearly shows we conceived the idea that the side is for contacting at least one of a diffusion layer, a fuel cell electrode and an electrolyte membrane.

8. Prior to January 9, 2004, we conceived the idea that the contact plate is constructed from passivating, corrosion-resistant metal. This is supported by the German language draft patent application in Exhibit A. An English language translation of the relevant section of the draft patent application is attached in Exhibit B. The translation clearly shows we conceived the idea that the contact plate is constructed from passivating, corrosion-resistant metal.
9. Prior to January 9, 2004, we conceived that the active area includes a contact surface and recesses, such that the recesses form a channel structure. This is supported by the German language draft patent application in Exhibit A. An English language translation of the relevant section of the draft patent application is attached in Exhibit B. The translation clearly shows we conceived that the active area includes a contact surface and recesses, such that the recesses form a channel structure.
10. An active area including contact surface and recesses, such that the recesses form a channel structure, is also clearly supported in the figure of Exhibit C.
11. Prior to January 9, 2004, we conceived the idea for a coating of an electrically conductive, corrosion resistant material. This is supported by the German language draft patent application in Exhibit A. An English language translation of the relevant section of the draft patent application is attached in Exhibit B. The translation clearly shows we conceived the idea for a coating of an electrically

conductive, corrosion resistant material.

12. Prior to January 9, 2004, we conceived that the coating includes carbon for depositing in liquid form. This is supported by the German language draft patent application, and a page from an Invention Record form, all in Exhibit A. An English language translation of the relevant section of the draft patent application and the Invention Record is attached in Exhibit D. A second Translator's Declaration is also provided. The translation clearly shows we conceived that the coating includes carbon for depositing in liquid form.
13. Prior to January 9, 2004, we conceived that the coating is disposed only on the contact surface of the active area. This is supported by the German language draft patent application in Exhibit A. An English language translation of the relevant section of the draft patent application is attached in Exhibit B. The translation clearly shows we conceived that the coating is disposed only on the contact surface of the active area.
14. A coating disposed only on the contact surface of the active area is also clearly supported in the figure of Exhibit C.
15. A patent application was diligently prepared disclosing at least the above features. Our diligence is evidenced by the date on the transmittal letter of the draft patent application from our German patent counsel to the assignee of our application in Exhibit A. The letter is dated December 3, 2003. The German priority application was filed February 26, 2004, a PCT application then filed on February 25, 2004 and then the present application was filed on August 26, 2006.


16. All statements made based on our own knowledge are true and that all statements made on information and belief are believed to be true.

17. We acknowledge that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.


Respectfully submitted,

  
\_\_\_\_\_  
Dieter Graf

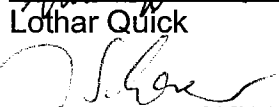
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\_\_\_\_\_  
Raimund Stroebel

04/19/11  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Lothar Quick

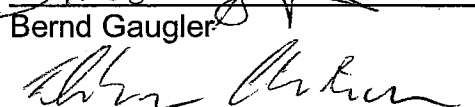
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Joachim Scherer

04/19/11  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Bernd Gaugler

04/23/11  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Christian Schleier

20/04/11  
\_\_\_\_\_  
Date

# Exhibit A

# Transmittal Letter and Draft German Language Application

Dipl.-Ing. J. Pfenning (-1994)  
Dipl.-Phys. K. H. Meinig (-1995)  
Dr.-Ing. A. Butenschön, München  
Dipl.-Ing. J. Bergmann\*, Berlin  
Dipl.-Chem. Dr. H. Reitzle, München  
Dipl.-Ing. U. Grambow, Dresden  
Dipl.-Phys. Dr. H. Gleiter, München  
Dr.-Ing. S. Golkowsky, Berlin  
Dipl.-Chem. Dr. H. Riepe\*\*, München  
\*auch Rechtsanwalt, \*\*nur Patentanwalt

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Telefax: 089/53 22 29

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01217 Dresden, Gostritzer Str. 61-63

Telefon: 03 51/87 18 160

Telefax: 03 51/87 18 162

e-mail: dd@pmp-patent.de

Berlin,

3. Dezember 2003

GO-LD/SH

037P 1863

REINZ-Dichtungs-GmbH  
Patentabteilung  
Reinzstraße 3-7

89233 Neu-Ulm

*Kopie komplett  
↳ Hr. Seiderer*

Beabsichtigte neue Deutsche Patentanmeldung  
"Kontaktplatte für Brennstoffzellen"  
RZ 25/03

Sehr geehrte Frau Hund,  
Sehr geehrter Herr Weiß,

*Hr. Seiderer hat korrigiert,  
Unterlagen an Hr. Quick wg.  
weiterer Kommentare  
weitergeleitet. Hf*

aufgrund der uns am [REDACTED] vorgelegten Unterlagen haben wir den beigelegten Entwurf einer Neuanmeldung formuliert. Wir bitten Sie, diesen sogleich zu prüfen und uns evtl. Änderungswünsche unmittelbar mitzuteilen sowie die Werte für die fett gedruckten Platzhalter zu ergänzen, damit die Einreichung der Anmeldung unverzüglich erfolgen kann.

Indem wir uns für den erteilten Auftrag bedanken, verbleiben wir

mit freundlichen Grüßen

*[Signature]*  
Dr. S. Golkowsky  
Patentanwalt

Anlagen  
Entwurf der Anmeldung



REINZ-Dichtungs-GmbH

[REDACTED]

# Patentansprüche

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1. Kontaktplatte für Brennstoffzellen mit einer zusammenhängenden aktiven Fläche auf zumindest einer zum Anliegen an einer Diffusionslage, einer Brennstoffzellenelektrode oder einer Elektrolytmembran bestimmten Seite der Kontaktplatte, wobei die aktive Fläche aus einer Kontaktfläche, die vollflächig eine Beschichtung aus einem elektrisch leitenden, korrosionsbeständigem Material aufweist, und aus Vertiefungen besteht, so dass die Vertiefungen eine Kanalstruktur bilden, dadurch gekennzeichnet, dass die Beschichtung (4) zumindest in Bodenbereichen (5) der Vertiefungen (3) ausgespart ist.
  2. Kontaktplatte nach Anspruch 1, dadurch gekennzeichnet, dass sie auf Basis eines Plattenkörpers (1) aus passivierendem Metall, vorzugsweise aus Edelstahl, gefertigt ist.
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

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Für die Beschichtung kommen verschiedene Beschich-  
tungsmaterialien in Frage. Kriterien für eine geeig-  
nete Auswahl sind elektrische Leitfähigkeit und Kor-  
rosionsbeständigkeit sowie eine gute Haftfähigkeit  
zur sicheren Verbindung mit einem Plattenkörper und

nicht zuletzt eine möglichst preisgünstige Verfügbarkeit. Von Vorteil mit Blick auf diese Kriterien sind insbesondere Beschichtungsmaterialien, die einen oder mehrere folgender Stoffe enthalten oder aus einem oder mehreren dieser Stoffe bestehen: Kohlenstoff, vorzugsweise in Form von Graphit, chrom- und/oder nickelhaltige Titanlegierungen, Niob, Seltenerdmetalle, Edelmetalle, vorzugsweise Gold, Platin, Palladium und/oder Rhodium, Metallboride, -nitride und/oder -carbide, vorzugsweise Titanborid, Titannitrid und/oder Titancarbid. Je nach Auftragsart kann auch eine Dispersion oder Suspension mit Partikeln solcher oder ähnlicher Materialien zur Erhöhung der Leitfähigkeit bei gleichzeitig guter Haftfähigkeit als Beschichtungsmaterial zum Einsatz kommen.

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# Page from German Language Invention Record

Im Gegensatz zu metallischen Bipolarplatten zeigen die aus Graphitkomposit hergestellt Gasverteilungsplatten eine inhärent geringere Korrosionsneigung unter Brennstoffzellenbedingungen. Um die für die Anwendung der Brennstoffzelle in mobilen Anwendungen nötigen Leistungsdichten zu erreichen, sind sehr dünne, somit letztlich metallische Bipolarplatten von entscheidender Bedeutung. Die Beschichtung der metallischen Bauteile z.B. mit graphitischen Materialien kann die Eigenschaften beider Bipolarplattentechnologien vereinen.

Graphitsuspensionen mit einem geeigneten Polymerbinder können mit einfachen, großtechnisch kostengünstig umsetzbaren Verfahren selektiv appliziert werden. Durch Anpassung der Formulierung und des Beschichtungsverfahrens sind verschiedene Schichtdicken präzise appliziert werden. Durch lateral begrenzte Beschichtungsverfahren (z.B. durch Schlitzdüsen, Schleudersprühen, Druckverfahren) kann die partielle Beschichtung der Bipolarplatten auch in einem quasi kontinuierlichen Prozess, ohne mechanische Maskierung in kurzen Taktzeiten realisiert werden.

Im Bereich von selektiven Metallbeschichtungen sind spezielle Verfahren möglich, die Material sparend und mit hohen Zykluszeiten, die Abscheidung der Leitfähigkeit erhaltenden Schicht gestatten. Durch Tampong galvanik können selektiv nur die mit der MEA in Kontakt stehenden, erhabenen Bereiche der Bipolarplatten Flowfields mit ausreichend geringen Edelmetallmengen beschichten. Durch Aufdrucken (z.B. Siebdruck, Walzendruck) einer verdünnten Metalldispersion (z.B. Gold oder Niob) auf die aktive Fläche der Bipolarplatte und anschließendes Aufschmelzen der Metallcluster (z.B. unter reduktiven Bedingungen zur gleichzeitigen Entfernung der Passivschicht bzw. der Verbindung der Bipolarplatten durch Lötten) auf die Edelstahloberfläche ist ebenfalls eine Material sparende Leitschicht möglich.

	Verbeschichtung (z.B. Fe, Pd, Pt)
	Goldbeschichtung (z.B. Gold)

#### Beschreibung der Einbindung

Wird die Brennstoffzelle in der angegebenen Weise eingebaut, so ist die Einbindungsgewichtung entsprechend zu berücksichtigen. Die Brennstoffzelle ist in der angegebenen Weise zu montieren. Die Brennstoffzelle ist in der angegebenen Weise zu montieren.

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# Exhibit B

#### Patent claims

1. A contact plate for fuel cells with a coherent, active surface on at least one side of the contact plate which is envisaged to bear on a diffusion layer, a fuel cell electrode or an electrolyte membrane, wherein the active surface consists of a contact surface which, over the complete surface, comprises a coating of an electrically conductive, corrosion-resistant material, and of recesses, so that the recesses form a channel structure, characterised in that the coating (4) is omitted at least in the base regions (5) of the recesses (3).
2. A contact plate according to claim 1, characterised in that it is manufactured on the basis of a plate body (1) of passivating metal, preferably of stainless steel.

Partial coating with materials having conductivity

Metallic bipolar plate

Declaration

I, Mark Neill, having a place of business, or residing at, Brahmsstrasse 20/0  
D-23556 Luebeck, Germany, do hereby declare that I am conversant with the English and

German languages and am a competent translator thereof. I declare further that the following is  
a true and correct translation made by me of

- claims 1 and 2 of a draft patent application of Reinz-Dichtungs-GmbH, case number 037P 1863  
dated [REDACTED]

- explanations given on a sketch accompanying the invention record "Leitfähige Beschichtung  
metallischer Bipolarplatten" (conductive coatings of metallic bipolar plates) by Joachim Scherer  
dated [REDACTED].

Date: 25-02-2011

By: MARK NEILL  
Printed Name

M. Neill  
Signature



# Exhibit C

**Telefax/Facsimile****REINZ-Dichtungs-GmbH**

Postfach 19 09

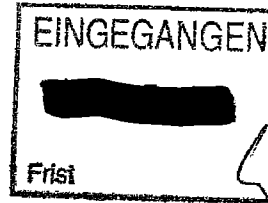
D-89229 Neu-Ulm

Fax: 0731/7046-16232

Tel.Zentrale: 0731/7046-0

Tel.direkt: 0731/7046-232

E-Mail: edelgard.hund@dana.com

**VICTOR REINZ™**

S 71

**An/To:** Patentanwaltskanzlei Pfenning,  
Meinig u. Partner**Ort/Location:** 10719 Berlin**Name/Attn.:** Dr.-Ing. S. Golkowsky**Abt./Dept.:****Fax Nr./No.:** 030/8813689**Von/From:** Edelgard Hund**Abt./Dept.:** PGE-Patente**Zchn./Ref.:** Neuanmeldung (wohl Rz.25/03)**Datum/Date:****Pages:** 2

Sehr geehrter Herr Dr. Golkowsky,

als Anlage erhalten Sie eine ergänzende Figur von Herrn Scherer zu der geplanten Neuanmeldung.

Mit freundlichen Grüßen

Reinz-Dichtungs-GmbH

i.A. Edelgard Hund

**EUROPEAN FUEL CELL SUPPORT CENTER**

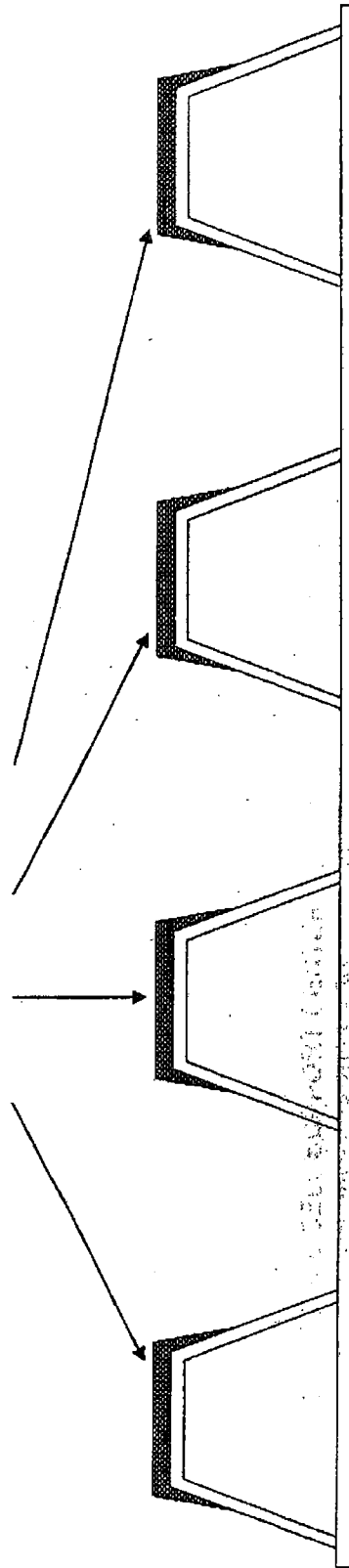
von: Joachim Scherer am

Seite 1 von 1

Skizze zur Anmeldung „Leitfähige Beschichtung  
metallischer Bipolarplatten“



**Partielle Beschichtung mit Leitfähigkeit erhaltenden Materialien**



**Metallische Bipolarplatte**

# Exhibit D

In contrast to metallic bipolar plates, the gas distribution plates manufactured of graphite composite display an inherently lower tendency to corrode under fuel cell conditions. Very thin, thus in the final analysis, metallic bipolar plates, are of decisive significance, in order to reach the power densities required for the application of the fuel cell in mobile applications. The coating of the metallic components e.g. with graphitic materials, may unify the characteristics of both bipolar plate technologies.

Graphite suspensions with a suitable polymer binder may be selectively applied with simple methods which may be applied in a large-technologically inexpensive manner. Different layer thicknesses may be applied in a precise manner due to the adaptation of the formulation and of the coating method. The partial coating of the bipolar plates may also be realised in a quasi continuous process without mechanical masking, in short cycle times due to the laterally limited coating methods (e.g. slit nozzles, centrifugal spraying, printing methods).

Special methods are possible in the field of selective metal coatings and these save material and with high cycle times, permit the precipitation of the layer having conductivity. One may selectively coat only the elevated regions of the bipolar plate flowfields which are in contact with the MEA, with sufficiently lower precious metal quantities, by way of dab-electroplating. Likewise, a conductive layer saving material is possible by way of printing (e.g. screen printing, roller printing) a diluted metal dispersion (e.g. gold or niobium) onto the active surface of the bipolar plate and subsequent melting of the metal cluster (e.g. under reductive conditions for the simultaneously removal of the passive layer or the connection of the bipolar plates by way of soldering) onto the stainless steel surface.

Various coating materials may be considered for the coating. Criteria for a suitable selection are the electrical conductivity and corrosion resistance as well as a good adhesiveness for the secure connection to a plate body and last but not least an as inexpensive as possible availability. With regard to these criteria, in particular coating materials which contains one or more of the following substances or consist of one or more of these substances, are advantageous: carbon, preferably in the form of graphite, chrome-containing and/or nickel-containing titanium alloys, niobium, rare earth metals, precious metals, preferably gold, platinum, palladium and/or rhodium, metal borides, metal nitrides and/or metal carbides, preferably titanium boride, titanium nitride and/or titanium carbide. Depending on the deposition manner, one may also apply a dispersion or suspension with particles of such or similar materials for increasing the conductivity with a simultaneously good adhesiveness, as a coating material.

Declaration

I, MARK NEILL, having a place of business, or residing at, BRAHNSSTRASSE 20/o  
D-23536 LÜBECK, GERMANY, do hereby declare that I am conversant with the English and

German languages and am a competent translator thereof. I declare further that the following is  
a true and correct translation made by me of

- a section of an invention record by Reinz-Dichtungs-GmbH dated [REDACTED] and
- a section of a draft patent application of Reinz-Dichtungs-GmbH, case number 037P 1863  
dated [REDACTED]

Date: 14.02.2011

By: MARK NEILL  
Printed Name

M. Neill  
Signature